

CLAIMS

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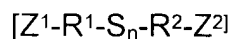
CLAIMS]

[1. Rubber composition vulcanizable with sulfur, characterized in that it comprises]

[a) at least one polymer selected from the group consisting of diene polymers, olefin/monomeric diene copolymers and halogenated isoolefin/para-alkylstyrene copolymers;]

[b) silica as filler;]

[c) at least one agent promoting linking between silica and polymer, said agent having the formula (I)]



[wherein]

[n is an integer between 2 and 8,]

[R¹ and R², which may be the same or different, are each selected from the collectives consisting of substituted or unsubstituted alkylene groups having a total of 1 to 18 carbon atoms and of substituted or unsubstituted arylene groups having a total of 6 to 12 carbon atoms,]

[Z¹ and Z², which may be the same or different, each represents a group]

[R³

[-Si-R⁴

[R⁵

1.]Rubber composition vulcanizable with sulfur, characterized in that it comprises:

a) least one polymer selected from the group consisting of diene polymers,

olefin/monomeric diene copolymers and halogenated isoolefin/para-alkylstyrene copolymers;

b) silica as filler;

c) at least one agent promoting linking between silica and polymer, said agent
having the formula (I)



wherein

n is an integer between 2 and 8.

R¹ and R², which may be the same or different, are each selected from the collectives consisting of substituted or unsubstituted alkylene groups having a total of 1 to 18 carbon atoms and of substituted or unsubstituted arylene groups having a total of 6 to 12 carbon atoms.

Z^1 and Z^2 , which may be the same or different, each represents a group

$$\mathbb{R}^3$$
$$-\text{Si}-\text{R}^4$$
 \mathbb{R}^5

where R³, R⁴ and R⁵, which may be the same or different, are each selected from the collective comprising alkyl groups having 1 to 4 carbon atoms, phenyl groups, alkoxy groups having 1 to 8 carbon atoms, and cycloalkoxy groups having 5 to 8 carbon atoms, on condition that at least one of R³, R⁴ and R⁵ is an alkoxy or cycloalkoxy;

d) at least one guanidine substituted by at least two groups which may be the same or different and each selected from the collective comprising alkyl, aryl or aralkyl groups;

1 and in that it has at least one of the following characteristics:

2 it comprises at least one diene polymer which has at least one amino terminal
3 group of an aliphatic or cycloaliphatic amine which is bonded thereto at the end of the chain,
4 the polymer then being devoid of alkoxysilane and silanol group;

5 the composition comprises at least one free aliphatic or cycloaliphatic amine.

6 (d) at least one guanidine substituted by at least two groups which may be the
7 same or different and each selected from the collective comprising alkyl, aryl or aralkyl
8 groups;]

9 [and in that it has at least one of the following characteristics:]

10 [It comprises at least one diene polymer which has at least one amino
11 terminal group of an aliphatic or cycloaliphatic amine which is bonded thereto at
12 the end of the chain, the polymer then being devoid of alkoxysilane and silanol
13 group;]

14 [the composition comprises at least one free aliphatic or cycloaliphatic
15 amine.]

- 16 2. Composition according to Claim 1, characterized in that the filler consists entirely of silica,
17 or contains at least 40% by weight of silica, or preferably at least 50% by weight of silica.
- 18 3. Composition according to either one of Claims 1 or 2, characterized in that in the linking
19 agent of formula (1), n is greater than 2, or if there are several such agents, at least 80% of n
20 is greater than 2 for the total of these compounds.

- 1 4. Composition according to any one of Claims 1 to 3, characterized in that the content of agent
2 of formula (1) or mixture of such agents is at least 4% by weight calculated on the weight of
3 silica or mixture of silicas used as filler.
- 4 5. Composition according to any one of Claims 1 to 4, characterized in that the content of
5 guanidine or mixture of guanidines is 0.5 to 4% by weight calculated on the weight of silica
6 or total of silicas, said content preferably ranging from 1 to 3% by weight.
- 7 6. Composition according to any one of Claims 1 to 5, characterized in that the content of free
8 aliphatic or cycloaliphatic amine, or mixture of free aliphatic or cycloaliphatic amines, is in
9 the range of 0.5 to 4% by weight calculated on the weight of silica or total of silicas, said
10 content advantageously being 1 to 3% by weight.
- 11 7. Composition according to any one of Claims 1 to 6, characterized in that it comprises at least
12 one free aliphatic or cycloaliphatic amine homogeneously dispersed in the composition.
- 13 8. Composition according to Claim 7, characterized in that the polymer is prepared in solution
14 and that the aliphatic or cycloaliphatic amine is introduced into this solution after stopping
15 the polymerization and before stripping of the solvent.
- 16 9. Tread of tire casing comprising at least one composition according to any one of Claims 1 to
17 8.
- 18 10. Tread obtained by vulcanization of the tread according to Claim 9.

- 1 11. Tire casing comprising at least one composition according to any one of Claims 1 to 8.
- 2 12. Tire casing obtained by vulcanizing the tire according to Claim 11.